

## Biosecurity Measures Plan Seaweed cultivation at Loch Spelve

Site name:	Loch Spelve (B)
Site FS number:	FS0253
Site location:	Loch Spelve, Mull, Argyll
APB name:	Scottish Sea Farms Ltd
APB number:	FB0125
BMP period:	October 2024 - ongoing
Date of next review:	18.10.24

### Farm overview

#### Description of Operation:

Scottish Sea Farms Ltd (SSF) plan to farm one species of native seaweed (*Laminaria saccharina*) at its licensed facility at Loch Spelve (B) (FS0253). The area proposed to farm the seaweed covers 14,700m<sup>2</sup>, consisting of 40 x 75m longlines suspended between an anchor at either end, with end spacer bars and a central bar at 25m.

SSF plan to seed the farm in October 2023 with the aim of producing 30 tonnes (wet weight) of in 2024 with harvesting will be carried out by SSF and Atlantic Garden over the course of two days, depending on weather conditions.

Harvested kelp will be brought ashore at Spelve slipway and processed at Forth Resource Management facility. All farming and processing will take place in a 160 mile radius.

Other interactions with the farm will consist of monthly checks of the structure in addition to checks preceding and after storm events.

#### Location:

Loch Spelve (B) is a licensed fish farm located at south west of Isle of Mull, Argyll, Scotland; coordinates 56°22.489'N 005°46.086'W. In Loch Spelve there are two mussel farm facilities located 1.7 and 3km from the SSF farm location.

#### Designated marine areas:

Loch Spelve (B) is located outside the Sound of Jura MPA, but with tidal sea water ebb and flow from the Sound of Jura MPA (Figure 1).

Figure 1. Loch Spelve (B) seaweed farm in relation to the Sound of Jura MPA.

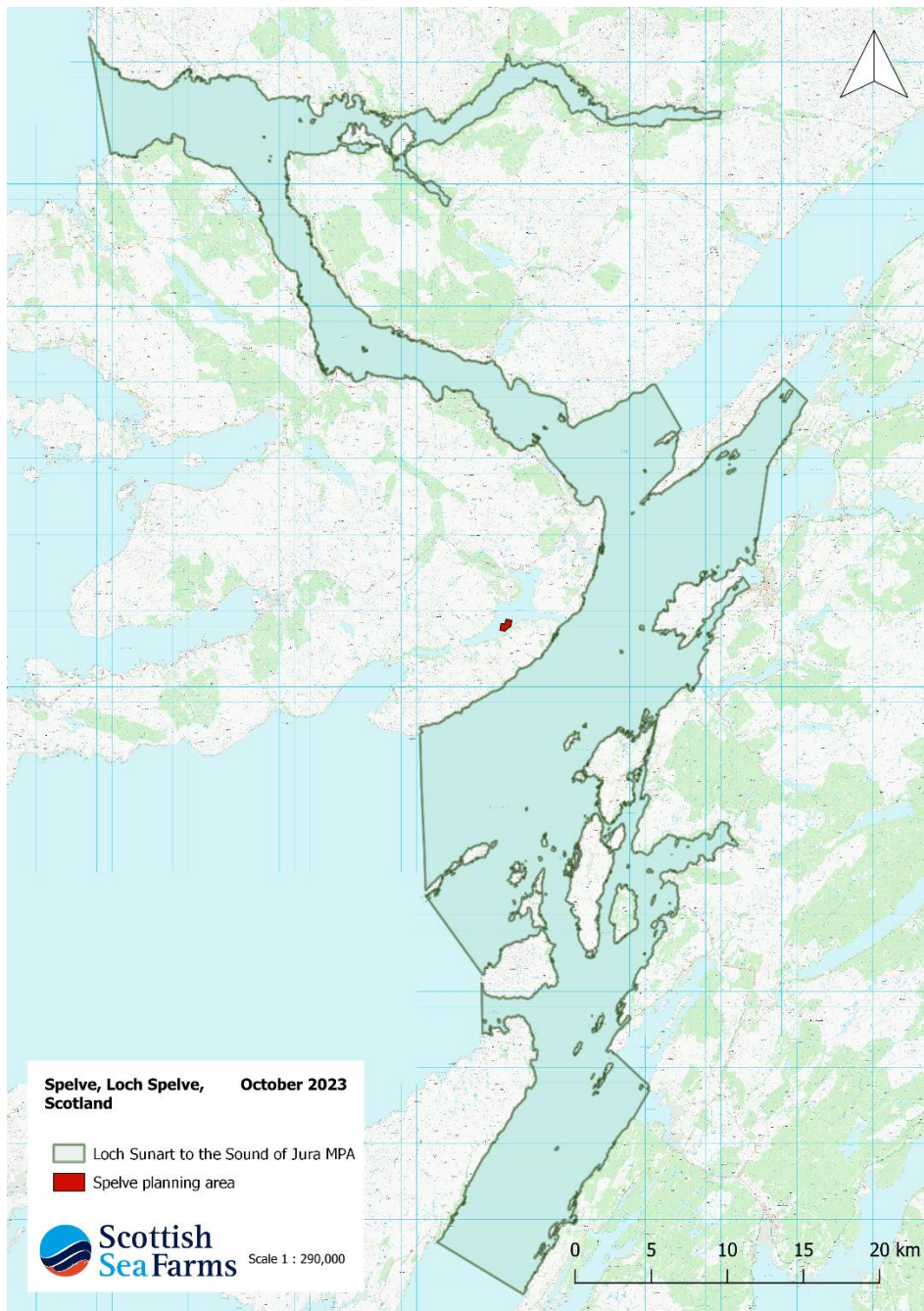


Figure 2. Site plan of seaweed farm in Loch Spelve (B) from southern aspect.

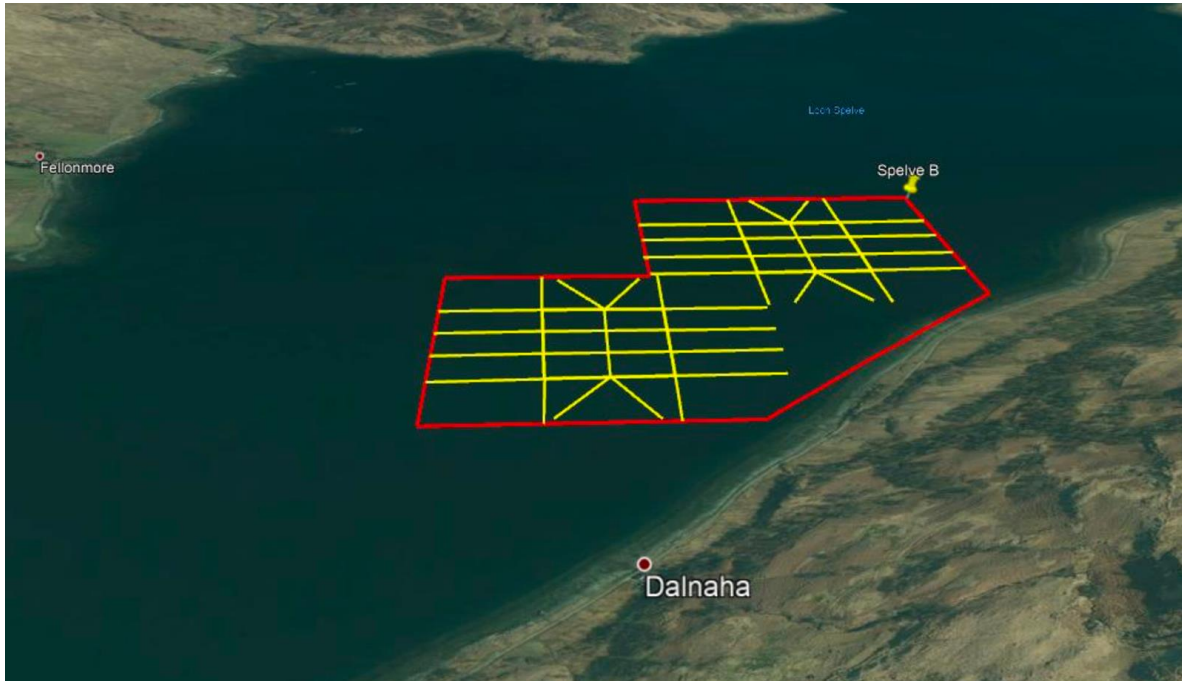


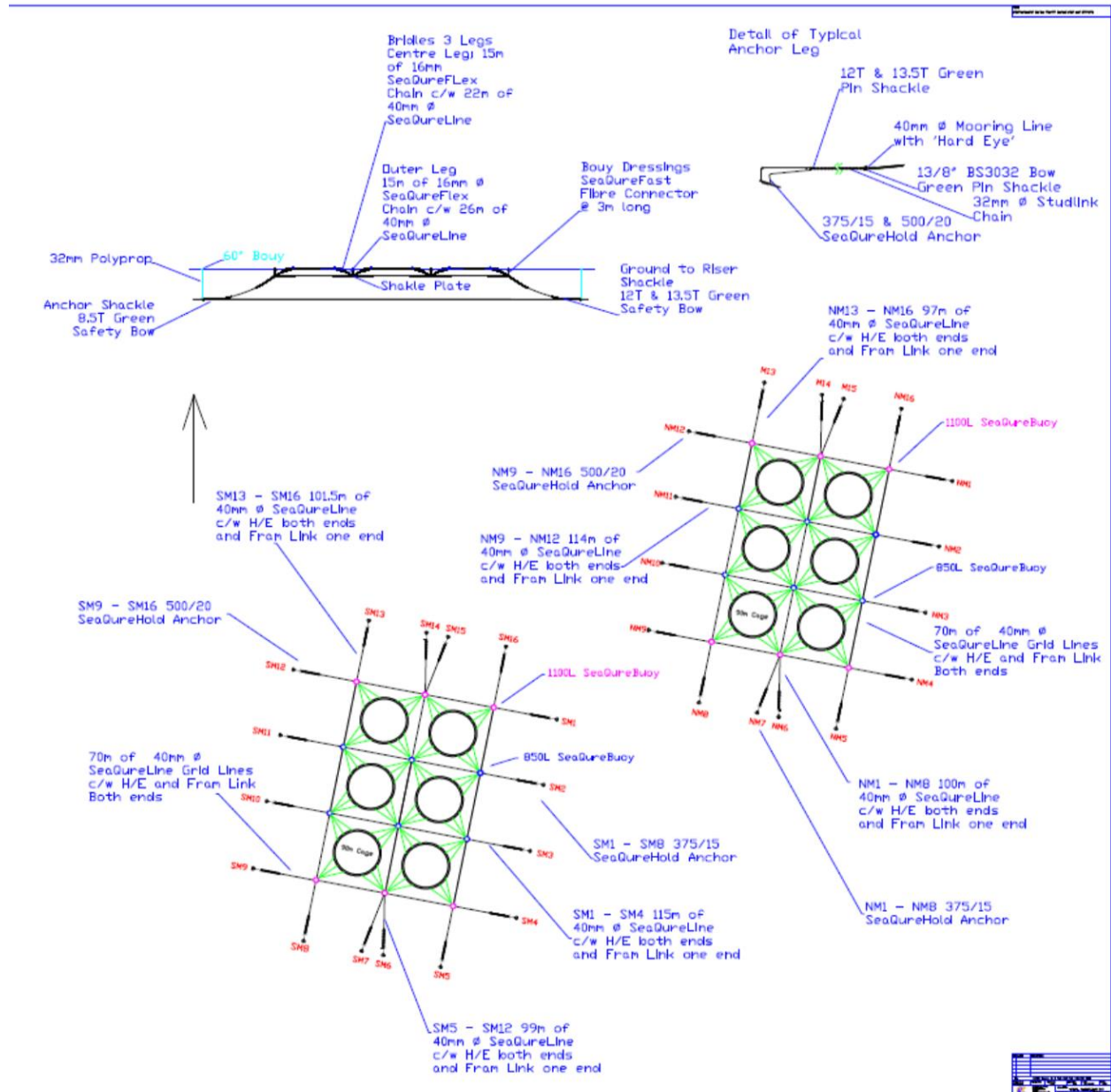
Figure 3. Site plan of seaweed farm at Loch Spelve (B) from northern aspect.



Seaweed line to be located on the 2x3 grid as indicated above and viewed from both southern aspect (Figure 2) and northern aspect (Figure 3).



Figure 4. Site plan layout of lines and grid for seaweed farm at Loch Spelve (B).



Lines will be located within the current grid squares and attach into the grid mooring system for security. Navigational markers, grid buoy and ancillary salmon farming equipment remain in place, excluding pens, nets and bridles.

### Floating structures:

The main structure of the farm will comprise 40x75m longline arrays. Each longline (growing rope) will be suspended at 2m below the surface from floating mooring buoys fixed to the seabed at two mooring points. Each longline will be supported and kept afloat by A3 buoys placed along the line at 12.5m distance. Each longline will be attached to the existing fish farm grid structure. The farm structure will have the following floating elements:

- Floating mooring buoys
- Longline buoys
- Unlit yellow Special Mark buoys
- Growing ropes
- Spacer bars (to prevent longline entanglement)
- Mooring lines/chain

### Subsurface structures:

The existing submarine fish farm grid will be raised to the surface and the longlines will be seeded on land, transported by boat and deployed onto the grid.

### Biosecurity hazards:

The main biosecurity hazards would be the introduction or colonization and growth of bio-fouling invasive species which are non-native species (NNS) of Scotland (Table 1).

As the Loch Spelve location may be stocked with farmed Atlantic salmon, wild or farmed wrasse, or farmed lumpfish consideration has been made as to any pathogens or diseases which may transfer between the seaweed and farmed fish. There are no known pathogens of seaweed which will transfer to farmed fish or from farmed fish to seaweed.

**Table 1. Key non-native species of Scotland which may be invasive or of concern to NatureScot.**

Key non-native species of Scotland	Description
<i>Sargassum muticum</i>	Macroalgae, Japan origin
<i>Didemnum Vexillum</i>	Carpet sea squirt, Japan origin
<i>Caprella mutica</i>	Japanese skeleton shrimp
<i>Schizoporella japonica</i>	Encrusting bryozoan
<i>Bugula neritina</i>	Bryozoan
<i>Styela clava</i>	Solitary sea squirt

<i>Codium fragile</i> subsp. <i>Tomentosoides</i>	Macroalgae, spongy green
<i>Austrominius modestus</i>	Barnacle, Australasia origin
<i>Undaria pinnatifida</i>	Macroalgae, Northeast Asia origin

#### **Anchors:**

Standard concrete anchors have a large surface area for colonisation. However, concrete anchors often lack structural complexity and take time to become bio fouled because of chemical leaching. Once a community has become established, concrete anchors are quite indistinguishable from surrounding substrate. Concrete anchors are typically coupled with a chain riser, which can also become heavily bio fouled Grid structures.

#### **Rope spacers:**

Where required, spacer bars will be made from metal and are suspended approximately 2m below the surface of the water. This could provide a suitable structure for settlement of NNS.

#### **Marker buoys:**

Floating buoys which mark each anchor and longline will be partially submerged and provide a manmade substrate for NNS settlement and will be in close proximity to the harvesting vessel. However, buoys may be easily cleaned during site visits to prevent the build-up of biofouling organisms.

### **Site activities affecting biosecurity**

#### **Maintenance of farm site:**

The farm structure will require maintenance throughout the growing season. This may include the disposal of biofouling which has colonised equipment.

#### **Seeding lines:**

Atlantic Garden is obtaining seed for the farm site from Hortimare B.V., the established Dutch marine seed provider. The seed will be propagated at Hortimare's facility in the Netherlands, using fertile sorus tissue collected by Atlantic Garden from breeding kelp populations within a 10-mile radius of the farm site. Hortimare B.V. will assist Atlantic Garden with the seeding of the farm structure in October 2023. The growing ropes will be seeded directly with the seed mix as opposed to wrapping seeded twine along each rope. This method of seeding allows for the seedlings to establish better on the rope, lowering the risk of plant debris due to poorly attached holdfasts. Hortimare have developed

a mechanised seeding technique that allows for the precise insertion of the seeded material onto the growing ropes, lowering the risk of seed attrition from the ropes upon submersion.

Hortimare follow a strict seeding protocol to mitigate biosecurity risks at all stages of the seed propagation and deployment, details of which can be provided upon request.

**Work vessels:**

The hull of the work vessels have the potential to accumulate biofouling and increase the risk of NNS. However, antifouling, cleaning and eradication measures are available that reduce this risk. Additionally, the vessels used will be SSF and Inverlussa fully MCA coded vessels will be operated on the farm that will not have travelled from other countries, regions or water bodies, thereby reducing the risk of NNS introduction.

**Biosecurity Control Measures**

The following biosecurity control measures are for the seaweed farming operations to control the risk of NNS specifically, and should be considered as additional to the existing biosecurity control measures plan in place for the fish farming operations at Loch Spelve (B).

Activity	Control measures																											
Vessel arrival with moorings, lines, anchors	<ul style="list-style-type: none"> <li>• Carry out regular biofouling inspections, antifouling treatments, with inspection of cleaning and disinfection records;</li> <li>• If the level of biofouling is ranked at level 3 or higher (see Biofouling Visual Assessment table 2) the materials/structure should not be introduced until biofouling is removed. Removal must be in a controlled manner with all removed material contained and not released to the marine environment</li> </ul>																											
	<p>Cleaning &amp; disinfection:</p> <table border="1" data-bbox="815 1518 1370 1960"> <thead> <tr> <th data-bbox="825 1547 1230 1581" rowspan="2">Operation</th> <th colspan="3" data-bbox="1238 1547 1361 1581">Stage</th> </tr> <tr> <th data-bbox="1238 1592 1267 1626">1</th> <th data-bbox="1275 1592 1303 1626">2</th> <th data-bbox="1311 1592 1340 1626">3</th> </tr> </thead> <tbody> <tr> <td data-bbox="825 1637 1230 1671">Arriving from outwith UK waters</td> <td data-bbox="1238 1637 1267 1671">x</td> <td data-bbox="1275 1637 1303 1671">x</td> <td data-bbox="1311 1637 1340 1671">x</td> </tr> <tr> <td data-bbox="825 1682 1230 1738">Leaving site suspected or confirmed with a notifiable disease</td> <td data-bbox="1238 1682 1267 1738">x</td> <td data-bbox="1275 1682 1303 1738">x</td> <td data-bbox="1311 1682 1340 1738">x</td> </tr> <tr> <td data-bbox="825 1749 1230 1805">Leaving site with Red Status of Biosecurity</td> <td data-bbox="1238 1749 1267 1805">x</td> <td data-bbox="1275 1749 1303 1805">x</td> <td data-bbox="1311 1749 1340 1805">x</td> </tr> <tr> <td data-bbox="825 1816 1230 1895">Operating between sites of equal Biosecurity Status within a single management area</td> <td data-bbox="1238 1816 1267 1895">x</td> <td data-bbox="1275 1816 1303 1895"></td> <td data-bbox="1311 1816 1340 1895"></td> </tr> <tr> <td data-bbox="825 1906 1230 1962">Operating on shuttle runs between sites of equal Biosecurity Status</td> <td data-bbox="1238 1906 1267 1962">x</td> <td data-bbox="1275 1906 1303 1962"></td> <td data-bbox="1311 1906 1340 1962"></td> </tr> </tbody> </table>	Operation	Stage			1	2	3	Arriving from outwith UK waters	x	x	x	Leaving site suspected or confirmed with a notifiable disease	x	x	x	Leaving site with Red Status of Biosecurity	x	x	x	Operating between sites of equal Biosecurity Status within a single management area	x			Operating on shuttle runs between sites of equal Biosecurity Status	x		
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Introduction of new construction materials/structures to the marine environment	<ul style="list-style-type: none"> <li>• Visual inspection prior to introduction with inspection of cleaning and disinfection records</li> </ul>				
Introduction of seed stock to farm	<ul style="list-style-type: none"> <li>• Use of a reputable seed supplier with no historic INNS issues</li> <li>• Supply of seed with mother plant derived from West Coast Scotland</li> <li>• Stringent visual inspection of seed prior to deployment.</li> </ul>				
Movement of site workers	<ul style="list-style-type: none"> <li>• Apply Check, Clean, Disinfect and Dry procedure for all clothing and equipment to SSF procedures.</li> </ul>				
Harvesting of seaweed:	<ul style="list-style-type: none"> <li>• Harvest should be checked for epiphytes and especially NNS</li> <li>• Harvested kelp will be stored correctly for onward transport to processing facility</li> </ul>				
Departure and removal of seaweed harvesting vessels, lines and moorings	<ul style="list-style-type: none"> <li>• Use of the Biofouling Visual Assessment (Table 2) prior to vessel departure or removing subsea equipment.</li> <li>• Removal will be in a controlled manner with all removed material contained</li> </ul>				



	and not released to the marine environment
Training on NNS:	<ul style="list-style-type: none"> <li>• Training will be given to key staff in the identification of NNS and using the Biofouling Visual Assessment (Table 2).</li> </ul>
Fish disease / NNS status awareness	<ul style="list-style-type: none"> <li>• Brief all staff and transport contractors as to potential fish diseases / NNS threats and required biosecurity procedures to manage risk of infection / introduction.</li> </ul>

### Contingency Plan:

<b>Hazard</b>	<b>Action</b>	<b>Responsibility</b>	<b>Equipment</b>
Fragmentation or dispersal of NNS into water column	Remove debris from the water column and dispose to landfill. Use the same procedures in place for routine cleaning.	Farm staff	Hand nets or boat hook
Work vessels ranked 3 or above in visual inspection (Table 2)	The vessel is not allowed entry to worksite. It should be removed from water at home port, cleaned and antifouled. Inspect surrounding berths.	Site manager, Farm staff	Laminated hard copy of Biofouling Visual Assessment table (Appendix A) to be available on site.
Rafted material with NNS dislodged	Remove from water and allow to air dry or dispose to landfill.	Farm staff	Hand nets or boat hook.
New non-native species found	Inform Marine Scotland and SNH. Follow Marine Scotland and SNH instructions. The GB Non-native Species Secretariat should also be informed so they can update species distribution and abundance databases for NNS. Relevant details are located on their website: <a href="http://www.nonnativespecies.org">http://www.nonnativespecies.org</a>	Site Manager	Copy of Marine Scotland contact available onsite.

**Table 2. Biofouling visual assessment (from Payne et al., 2014)**

<b>Score</b>	<b>Description</b>	<b>Visual estimate of biofouling cover</b>
0	No visible fouling. Hull/structure entirely clean, no biofilm on visible submerged parts of the hull.	Nil
1	Slime fouling only. Submerged hull/structure areas partially or entirely covered in biofilm, but the absence of any plants or animals.	Nil
2	Light fouling. Hull/structure covered in biofilm and one to two very small patches of one type of plant or animal.	1–5 % of visible submerged surfaces
3	Considerable fouling of hull/structure. Presence of biofilm, and fouling still patchy, but clearly visible and comprised of either one or more types of plant and/or animal.	6–15 % of visible submerged surfaces
4	Extensive fouling of hull/structure. Presence of biofilm and abundant fouling assemblages consisting of more than one type of plant or animal.	16–40 % of visible submerged surfaces
5	Very heavy fouling of hull/structure. Many different types of plant and / or animal covering most of visible hull surfaces.	41–100 % of visible submerged surfaces